REPORT

OF THE

TRUSTEES

OF

RUTGERS SCIENTIFIC SCHOOL,

To His Excellency Joel Parker,

FOR THE YEAR 1865.

TRENTON, N. J.:
PRINTED AT THE "STATE GAZETTE" OFFICE.
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REPORT.

To his Excellency Joel Parker, Governor of the State of New Jersey:

SIR:—I beg leave to submit the Report of Rutgers Scientific School, in accordance with the directions of the fourth paragraph of section fifth of the act of Congress, approved July 2d, 1862; and section fifth of the act of the Legislature of New Jersey, approved April 4th, 1864.

The paragraph of the act of Congress is as follows:

"An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State, industrial and economical statistics, as may be supposed useful; one copy of which shall be transmitted by mail free, by each, to all the other colleges, which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior."

The section of the act of the Legislature is as follows:

"And be it enacted, That said Trustees shall annually make and distribute the reports required by the fourth paragraph of section fifth of said act of Congress."

A course of instruction for the Rutgers Scientific School was drawn up with great care by the Faculty, after visiting the principal scientific schools in the United States, and extensive correspondence with scientific men in different parts of our country, and was then unanimously adopted by the Board of Trustees of Rutgers College, subject, however, to the approval of the Board of Visitors, appointed by your Excellency and the Senate of the State of New Jersey. This course of study was then submitted to the Board of Visitors, by whom it was very carefully examined and unanimously approved. A printed copy of this course of study is herewith submitted. Appendix A.

The School went into operation September 20th, 1865, under the direction of the following Faculty:

Faculty of Rutgers Scientific School.

Rev. WILLIAM HENRY CAMPBELL, D.D., LL.D., President and Professor of Moral Philosophy.

GEORGE H. COOK, Ph. D., Vice President and Professor of Chemistry and Natural History.

David Murray, A. M., Professor of Mathematics, Natural Philosophy and Astronomy.

Gustavus Fischer, Professor of Modern Languages and Literature.

Rev. Cornelius Ettinge Crispell, A. M., Professor of Ancient and Modern History.

Rev. Theodore Sandford Doolittle, A. M., Professor of Rhetoric, Logic and Mental Philosophy.

Luther H. Tucker, A. M., Professor of Theory and Practice of Agriculture.

John C. Smock, A. M., Tutor in Chemistry.

—— ——, Tutor in Mathematics, Civil Engineering and Military Tactics.

John H. Knight, Superintendent of Experimental Farm.

An earlier day could not be fixed for the opening of the school because very little of the scrip had been sold, and therefore there were no funds for the support of the school; and indeed when it did begin, the amount of scrip sold would not yield, by January 1st, 1866, a larger sum than $1200, to meet all the salaries of the professors and tutors employed. Still the Trustees thought it best to begin, even though they were running the risk of a far larger expenditure than the interest from scrip sold would in any event cover. And they, furthermore, resolved to admit to the school one from each county of the State, although the funds were not provided to meet the expenses of their tuition.

The school will close its first term on December 19th, and has had eight students in attendance, seven of whom are pursuing the regular studies of the first year of the course, and one a resident graduate of the college, is pursuing analytical chemistry.

Several reasons may be given why a larger number of pupils are not in attendance.

1. The board of chosen freeholders, who are to appoint the pupils, hold their meetings in spring, and the notice of the proposed opening of the school was sent after the board had met and adjourned.

2. This appointing of students is quite out of the ordinary routine of business, which comes before the board of freeholders, and it will therefore require some little time for them to get acquainted with the new duties; after which, we apprehend there will be no delay in securing for each county the great advantages which the Scientific School offers.

At the present time, but two of the eight in attendance on the school, have been appointed by the freeholders. One of them is from Union, and the other from Sussex county. Two other counties made appointments, but one of the persons was under age, and the other was not fully prepared to stand the examination. Both of these, however, will enter the school hereafter. Five or six counties are known to have students in view, whom they purpose to appoint.

The examination to which the persons applying for admission are subjected is strict. The subjects, however, upon which they are examined, are all taught in our best common schools; and we believe that the influence of the scientific school, in requiring as it does a thorough preparation in these subjects of common school education, will have an important and most beneficial influence on the schools of the State.

The examination was passed in a very commendable manner by the young gentlemen who have been admitted. Their attention to their studies during the present term, together with their thorough preparation on entering, give high hopes for the future of the school. But upon this subject we will have the board of visitors to speak, who have been notified to attend the examination of the students on December 19th, and who will make their report to your excellency.

Full provision has been made by the Trustees of Rutgers College, for the study of analytical chemistry. The resident graduate, and advanced student of the scientific school is now making full use of this provision, and analytical chemistry. will make a part of the course of study of the other students in the second term of this year, as laid down in the printed schedule.

Rooms and fixtures for the advantageous study and practice of mechanical and architectural drawing have been provided, and the students are daily employed in this exercise. The expense in procuring, arranging, and furnishing these various apartments, has been over $900.

The observatory for the practical study of astronomy will soon be completed and furnished, with all necessary instruments and appliances for practical instruction. The cost of the building and apparatus when fully completed and furnished, will reach, and most probably exceed five thousand dollars.

The act of the Legislature required the trustees "to furnish and provide a suitable tract of land, conveniently located for an experimental farm." A farm of one hundred acres conveniently located, was purchased, and in the judgment of eminent and practical agriculturists, who were consulted before the purchase, it is thought to be admirably adapted to the purpose intended. But at the time of the purchase, it was in an extremely low state. There were scarcely any fences on it, and more than one-third of it was covered with bushes and stumps, the timber having been cut off, but the ground not cleared for cultivation. During the year, some portions have been cultivated, the whole farm cleared of bushes for plowing, and several acres thoroughly underdrained. Between twenty-five and thirty acres, which include all the cleared land not in meadow, have been plowed and prepared for cropping in spring. Every thing is now in a course of steady progress to make the farm, what the friends of scientific agriculture in New Jersey desire it should be. Provision is made for securing from the city of New Brunswick, waste fertilizers of all sorts. The original cost of the farm was fifteen thousand dollars, and

the expense of it this year, down to November 30, over and above the amount received from crops is fully three thousand dollars.

In concluding this report, I beg leave to say on behalf of the trustees and faculty, that the purpose of both is to do by means of the Rutgers Scientific School, all that can be done for the intellectual and moral education of the youth of New Jersey.

All of which is most respectfully submitted, on behalf of the Trustees of Rutgers College.

WM. H. CAMPBELL,
President of the Board of Trustees.

New Brunswick, Dec. 9, 1865.

APPENDIX A.

PLAN AND COURSE OF INSTRUCTION

OF THE

RUTGERS SCIENTIFIC SCHOOL,

RUTGERS COLLEGE NEW BRUNSWICK, N. J.

ADOPTED BY THE TRUSTEES OF THE COLLEGE, AND APPROVED BY THE BOARD OF VISITORS OF THE STATE OF NEW JERSEY.

COURSES OF STUDY.

The studies will be given in two courses, viz:

I. Civil Engineering and Mechanics.

II. Chemistry and Agriculture.

Either of these will occupy three years.

During the first year and a portion of the other years the studies of the two courses will be the same.

The studies pursued include the following:

Practical Chemistry, Chemical Analysis, and Chemistry applied to the Arts.

Land Surveying, Topographical Surveying, Civil Engineering, Architecture and Draughting.

Mechanical Philosophy, Machinery, Hydraulics.

Agriculture.

Geology and Mineralogy, and their application to Mining and Metallurgy.

Botany and Geology, with their relations to Vegetable and Animal Physiology.

Astronomy and Navigation.

Military Tactics.

French and German.

Instruction will also be afforded in Rhetoric, Mental Philosophy, History, Political Economy and International Law.

Courses of Lectures to adults upon various departments of Agriculture and the Mechanic Arts will also be given at stated times, through the second term of the year.

ARRANGEMENT OF STUDIES.

FIRST YEAR.

I. COURSE IN CIVIL ENGINEERING AND MECHANICS.

FIRST TERM.

Algebra, Quadratic Equations.
Geometry—three Books.
Draughting—Constructing Problems.
Elementary Principles of Zoology and Mineralogy.
Rhetoric, Exercises in Elocution and Composition.
French.

SECOND TERM.

Geometry, finished.
Geometrical Draughting.
Meteorology and Modes of Keeping Meteorological Register.
History—Composition and Declamation.
Book-Keeping.
French.

THIRD TERM.

Algebra, finished.
Mensuration—Line Surveying.
Elements of Botany.
Physical Geography.
History, Composition and Declamation.
Book-Keeping.
Drawing.
French.

II. COURSE IN CHEMISTRY AND AGRICULTURE.

FIRST TERM.

Algebra, Quadratic Equations.
Geometry—three Books.
Draughting—Constructing Problems.
Elementary Principles of Zoology and Mineralogy.
Rhetoric, Exercises in Elocution and Composition.
French.

SECOND TERM.

Geometry, finished.
Geometrical Draughting.
Meteorology and Modes of Keeping Meteorological Register.
History—Composition and Declamation.
Book-Keeping.
French.

THIRD TERM.

Algebra, finished.
Mensuration—Line Surveying.
Elements of Botany.
Physical Geography.
History, Composition and Declamation.
Book-Keeping.
Drawing.
French.

SECOND YEAR.

FIRST TERM.

Trigonometry, Surveying and Navigation
Descriptive Geometry and Draughting.
Elements of Chemistry and Mineralogy.
Rhetoric, Composition, Declamation.
French.

SECOND TERM.

Analytical Geometry.
Descriptive Geometry and Draughting.
Physics and General Chemistry.
Mechanics—Text-book in French.
Strength of Materials, Stability of Structures.
English Composition and Declamation.
German.

THIRD TERM.

Differential and Integral Calculus.
Leveling, R. R. Engineering and Topography.
Topgraphical Draughting.
Optics and Optical Instruments.
Mental Philosophy—Essays.
German.

FIRST TERM.

Trigonometry, Surveying and Navigation
Descriptive Geometry and Draughting.
Elements of Chemistry and Mineralogy.
Rhetoric, Composition, Declamation.
French.

SECOND TERM.

Analytical Chemistry, qualitative.
Physics and General Chemistry.
Mineralogy.
Agriculture—its Principles.
English Composition and Declamation.
German.

THIRD TERM.

Physics and Chemistry.
Analytical Chemistry—quantitative.
Agriculture—its Processes.
Mental Philosophy—Essays.
German.

THIRD YEAR.

FIRST TERM.

Astronomy and Use of Astronomical Instruments.
Engineering Constructions, Roads, Bridges, &c.
Moral Philosophy, Essays.
German.

SECOND TERM.

Geodetical Surveying.
Machinery—Motive Powers, &c.
Machines employed in Engineering.
Geology.
Political Economy.
German.

THIRD TERM.

Hydraulic Engineering.
Designs for and Discussions of Constructions and Machines.
Architecture.
Constitution of the United States.

FIRST TERM.

Metallurgy and Mining.
Elements of Geology.
Moral Philosophy, Essays.
German.
Agriculture—Its Products.

SECOND TERM.

Elements of Technology.
Agriculture—Its products, continued.
Geology.
Political Economy.
German.

THIRD TERM.

Agriculture—Horticultural Products and Rural Embellishment.
Theses on Scientific and Practical subjects.
Constitution of the United States.

THEORY AND PRACTICE OF AGRICULTURE.

OUTLINE OF THE COURSE.

Instruction in the Theory and Practice of Agriculture will be conveyed for the present mainly by Lectures, except where suitable text-books can be obtained.

Opportunities for observation upon the College Farm will be given from time to time, and we hope to secure ere long, a cabinet of specimens and models by which the Lectures delivered may be illustrated and exemplified. During the Terms mentioned below, the following subjects will be treated.

I. SECOND TERM, SECOND YEAR.—Agriculture, its *Principles.*

Its development and present condition as an Art.
Its connection with the several branches of science.
The economic requisites of vegetable growth, including soils, and the theory of manures.

II. THIRD TERM, SECOND YEAR.—Agriculture, its *Processes.*

Tillage, plowing; the physical manipulation of the land.
Implements and Machinery.
Drainage, Irrigation, etc.
The Practice of Manures.
Farm Buildings—their construction and arrangement.

III. First Term, Third Year.—Agriculture, its *Products.*

1. *Farming and Farm Crops.*

The cereals, their cultivation, and management and uses.
Hemp, Flax and other commercial crops.
Root Crops and the Legumes.
Grasses and the care of Pasture Lands.
Rotation of Crops, and the use of Artificial Fertilizers.

IV. Second Term, Third Year.—*Products continued.*

2. *Animals and Animal Products.*

The Principles of Breeding and the various Improved Breeds.
The care of Domestic Animals and Fattening for Market.
Dairy Management, including Milk, Butter and Cheese.
Animals of Draught.

V. Third Term, Third Year.—*Products continued.*

3. *Horticultural Products and Rural Embellishment.*

The Orchard, including the Nursery propagation of Trees.
The Market Garden; forcing of plants and fruits.
The Vineyard; manufacture of wine, cider, &c.
Ornamental Trees and Shrubs, Landscape Gardening.

Either during the First Term of the Second Year, or subsequently, the study of Book-keeping will be continued with special reference to *Farm accounts*, which is believed to be one of the most important branches of study, and opportunities of practice will ultimately be afforded the students in keeping the accounts of the College Farm. The study of *Botany* will also be continued with direct bearing upon the plants, useful or injurious, which the farmer most frequently meets. Some attention will also be given to *Entomology*, either as a separate branch, or in connection with those Farm and Orchard products which suffer most from insect depredators.

The lectures of the different terms are adapted as far as possible to the seasons when they can best be practically exemplified.

For College Graduates and other advanced students who may wish to take a one year course in Agriculture only, the lectures will be so arranged that such students can attend a double course during two-thirds of the year, thus:

1st Term—The Lectures numbered ..... III.
2d " " " " ..... I and IV.
3d " " " " ..... II and V.

MILITARY TACTICS.

During the third term of each year, the students will be drilled in Military tactics, including infantry and artillery. They will also be instructed in the principles of Military Engineering and Fortification, and will be afforded opportunities for visiting the various military posts and fortifications in the vicinity.

Among the advantages offered for the profitable pursuit of the above studies are:

I. The Library, the Collections, the Literary Societies, and all the facilities for literary education furnished by Rutgers College.

II. A Farm, where special attention will be given to Market Gardening, and to the cultivation of fruits; where the best modes of culture and the improved implements are used; and where a system of keeping a full and complete account of all the operations, expenses and income of the farm can be studied.

III. An Observatory, arranged and fitted with all the instruments needed for teaching practical astronomy.

IV. Accommodations for a Laboratory and Museum, with ample room for lectures upon experimental science, and for the practical operations of analytical chemistry; and where special provision is made for spreading out and exhibiting the collections of the minerals, rocks, fossils, plants and animals of the State.

V. Full sets of instruments for Surveying and Engineering.

VI. Excursions to mines, manufactories, &c., made under the direction of professors.

Admission.—Applicants for admission to either of the above courses, as candidates for a diploma, must be, at least, sixteen years of age, and must bring testimonials of good moral character. They must also pass a satisfactory examination in the following subjects, viz:—Arithmetic, Algebra to Quadratic Equations, English Grammar and Geography.

Persons desiring to enter the school for the purpose of pursuing special branches, will be required to pass an examination on the subjects necessary to fit them for pursuing those branches to advantage.

Adults who wish to attend upon any of the courses of lectures, and are not candidates for diplomas or certificates, can do so, subject only to the rules for fees and discipline.

The proper time for entrance is at Commencement (June 19th and 20th, 1866), or at the beginning of the College year (September 20th,

1866), when new classes are formed; but students will be admitted to a class at any time, upon their passing a satisfactory examination on the subjects the class have passed over.

Examinations are held at the close of each term.

Diplomas will be conferred upon those who have passed satisfactory examinations upon all the subjects prescribed in either Course of Study; and Certificates will be given to those who pass examinations in special branches.

FEES.—The charge for tuition is $75 a year; one-third, or $25, being payable at the commencement of each term.

The annual charge for incidentals, the present year, is $8.

Students in Analytical Chemistry are charged $15 additional, each term, for chemicals and use of apparatus.

The President's fee for conferring the diploma is $5.

The terms and vacations are the same as those of the College, viz:

1. September 20th to Wednesday before Christmas.
2. Thursday after New Year's day to first Wednesday of April.
3. Thursday after second Wednesday of April to next to last Wednesday of June.

Communications may be addressed to Prof. GEO. H. COOK, Vice President of the College.

WM. H. CAMPBELL,
President of Rutgers College.